Octave Remote Resistor-programmable Temperature Switches AP2602

General Description

The AP2602 are fully integrated, resistor programmable octave remote temperature switches with selectable external/internal trigger voltages setting. The thresholds are set by external resistors and thermistors with negative temperature coefficient.

The AP2602 provides 4 open-drain, active low, over-temperature outputs for each 2 sensors. These switches operate with a 2.7V to 5.5V single supply.

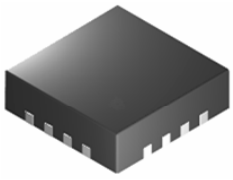
The AP2602 are available in 16-pin QFN-3X3-16 package.

Features

- 8 Remote Temperature Switches Set by Thermistor and External Resistors
- 4 Open-drain Active Low Output Stages for Each 2 Temperature Switches
- Selectable External/Internal Trigger Voltages Setting
- Built-in Hysteresis Temperature when Using Internal Setting Trigger Voltage
- Guaranteed Output Signal Valid to V_{CC}=0.8V
- QFN-3X3-16 Package

Applications

- µP Temperature Monitoring High-speed Computers
- Temperature Control
- Temperature Alarms
- Fan Control
- Automotives



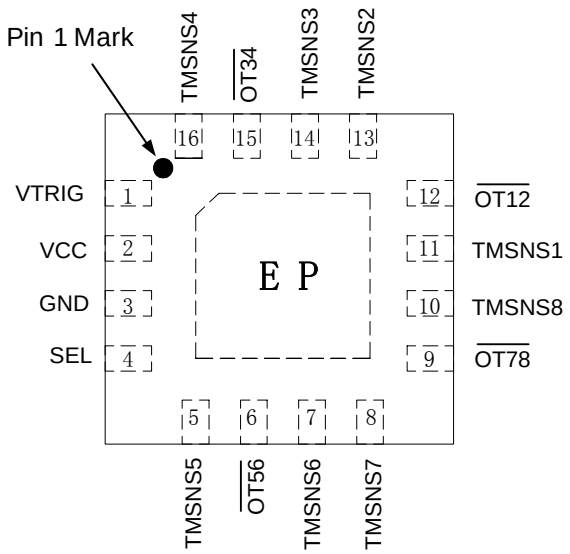
QFN-3X3-16

Figure 1. Package Type of AP2602

Octave Remote Resistor-programmable Temperature Switches AP2602

Pin Configuration

FN Package
(QFN-3X3-16)



Note 1: Recommend connecting the thermal pad to GND for excellent power dissipation.

Figure 2. Pin Configuration of AP2602 (Top View)

Pin Description

Pin Number	Pin Name	Function
1	VTRIG	Input of external setting trigger voltage
2	VCC	Power-supply input
3	GND	Ground
4	SEL	Connect SEL to GND to select external trigger voltage, while connecting SEL to VCC to select internal trigger voltage. Don't leave the pin floating
5,7,8,10, 11,13,14,16	TMSNSX	Connect an external 1% resistor from TMSNSX to GND to set trigger point of remote temperature sensorX
6,9,12,15	$\overline{\text{OTXY}}$	Open-Drain, active low, over-temperature output for sensor 1, 2, sensor 3, 4, sensor 5, 6, sensor 7, 8 respectively. The $\overline{\text{OTXY}}$ outputs are the wire-or results of sensorX and sensorY

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Functional Block Diagram

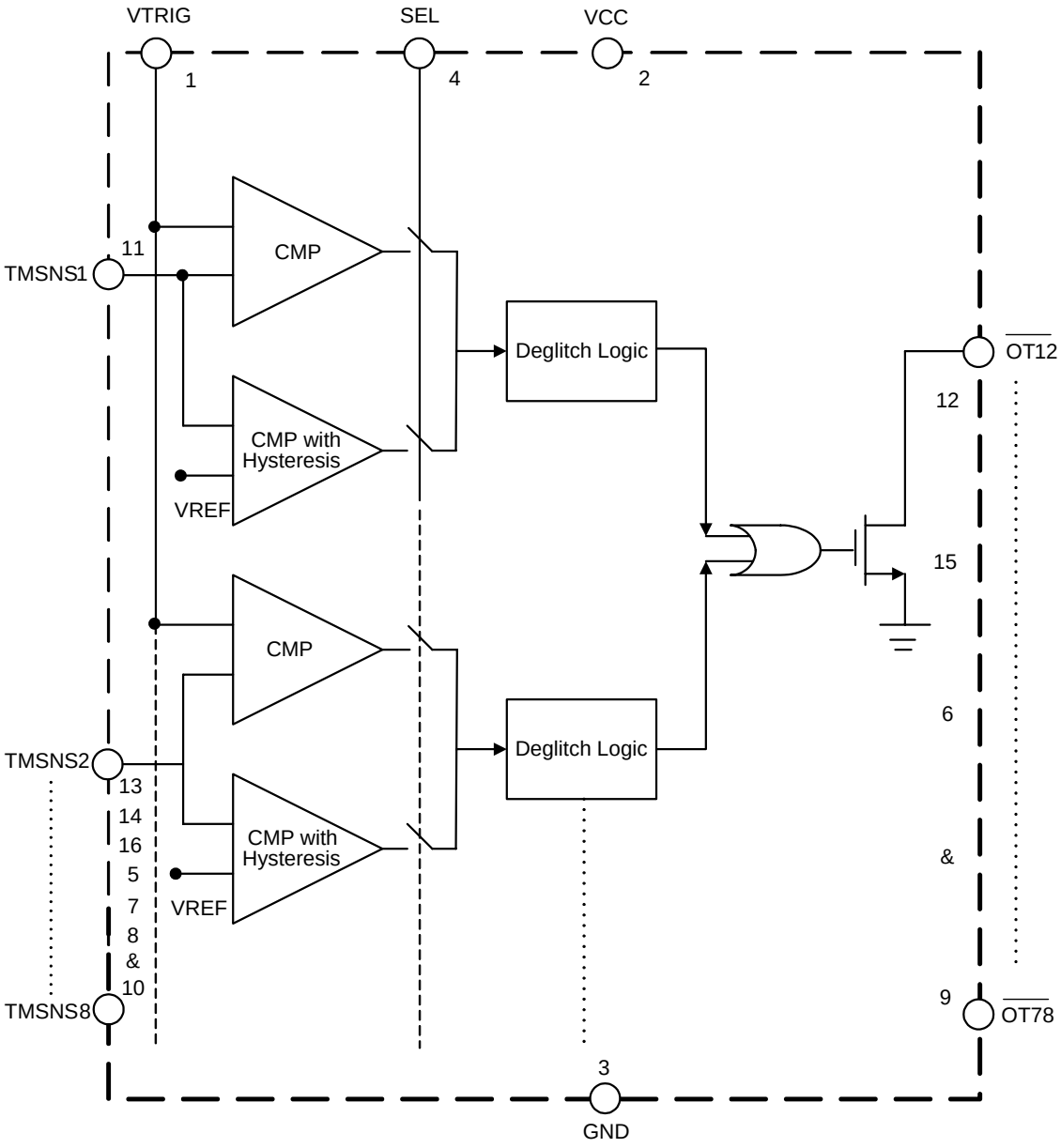
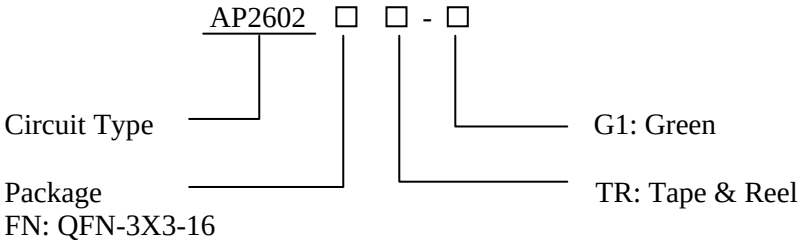


Figure 3. Functional Block Diagram of AP2602

Octave Remote Resistor-programmable Temperature Switches AP2602

Ordering Information



Package	Temperature Range	Part Number	Marking ID	Packing Type
QFN-3X3-16	-40 to 125°C	AP2602FNTR-G1	B2E	Tape & Reel

BCD Semiconductor's Pb-free products, as designated with "G1" suffix in the part number, are RoHS compliant and green.

Absolute Maximum Ratings (Note 2)

Parameter	Symbol	Value		Unit
Supply Voltage	V_{CC}	-0.3 to 6		V
$\overline{OTXY}$ Voltage	V_{OT}	-0.3 to 6		V
TMSNSX, VTRIG Voltage	V_{TMSNSX}, V_{TRIG}	-0.3 to V_{CC}+0.3		V
SEL Voltage	V_{SEL}	-0.3 to 6		V
Output Current (All Pins)		20		mA
Input Current (All Pins)		20		mA
Operating Junction Temperature	T_J	150		°C
Storage Temperature Range	T_{STG}	-65 to 150		°C
Lead Temperature (Soldering, 10 seconds)	T_{LEAD}	260		°C
Thermal Resistance	θ_{JA}	QFN-3X3-16	68	°C/W
ESD (Machine Model)		200		V
ESD (Human Body Model)		2000		V

Note 2: Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{CC}	2.7	5.5	V
Operating Ambient Temperature Range	T_A	-40	125	°C

Electrical Characteristics

V_{CC}=2.7V to 5.5V, T_A =-40°C to 125°C, unless otherwise specified. Typical values are at T_A=25°C.

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Supply Voltage	V_{CC}			2.7		5.5	V
Supply Current	I_{CC}	V_{CC}=3.3V $\overline{OTXY}$ float	V_{TMSNSX}=V_{CC}		40	100	μA
			V_{TMSNSX}=GND		55	110	
TMSNSX Input Threshold	V_{TH}/V_{CC}	V_{CC}=5V, V_{SEL}=V_{CC},		0.244	0.25	0.256	V/V
		V_{CC}=3.3V, V_{SEL}=V_{CC},		0.24	0.25	0.26	
VTRIG Input Range	V_{TRIG}	0<V_{TRIG}<0.4×V_{CC}		0.5		0.4× V_{CC}	V
Offset Voltage between VTRIG and TMSNSX	V_{OS}	V_{CC}=5V, V_{SEL}=GND		-15		15	mV
SEL Input Voltage	V_{IH}	V_{CC}=5V		2			V
	V_{IL}	V_{CC}=5V				1	V
Open-drain $\overline{OTXY}$ Output Sink Current	I_{SINK}	V_{OT}=0.3V, V_{TMSNSX}=0V		3	4.5		mA
Open-drain $\overline{OTXY}$ Output Leakage Current	$I_{LEAK-OT}$	V_{OT}=V_{CC}, V_{TMSNSX}=5V				1	μA
Thermal Resistance	θ_{JC}	QFN-3X3-16			4.2		°C/W

Typical Performance Characteristics

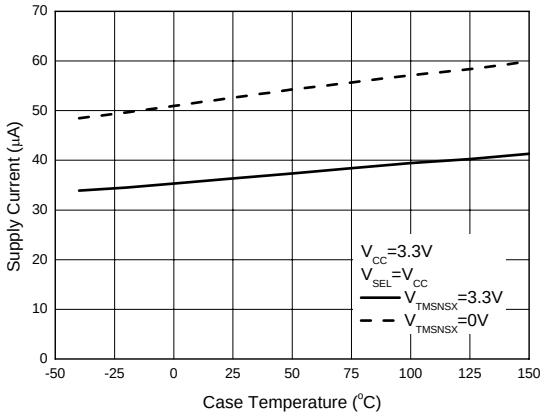


Figure 4. Supply Current vs. Case Temperature

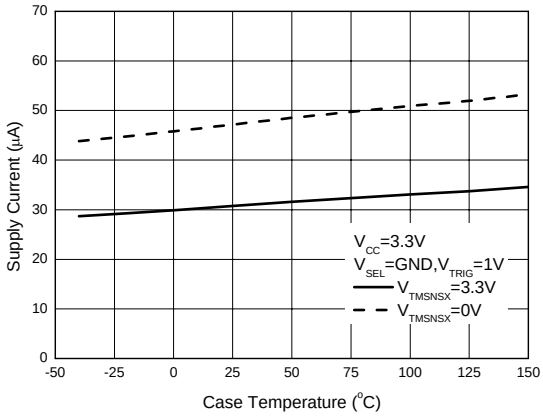


Figure 5. Supply Current vs. Case Temperature

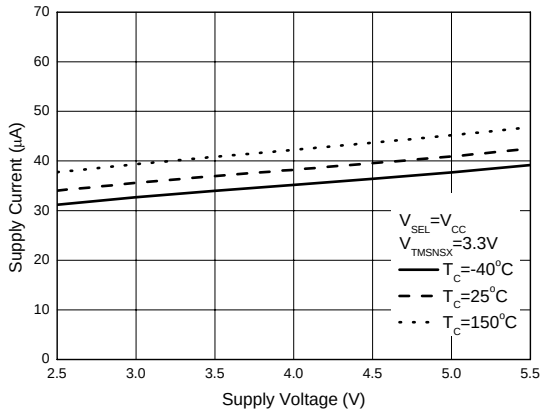


Figure 6. Supply Current vs. Supply Voltage

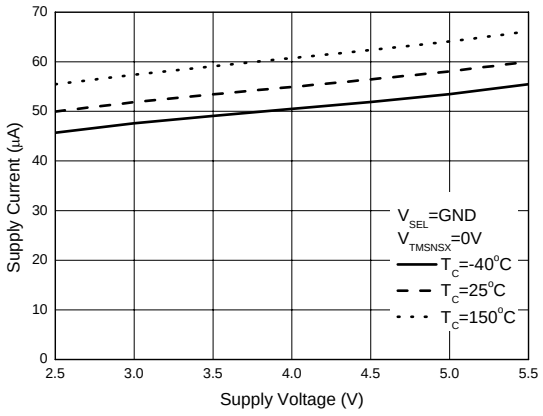


Figure 7. Supply Current vs. Supply Voltage

Typical Performance Characteristics (Continued)

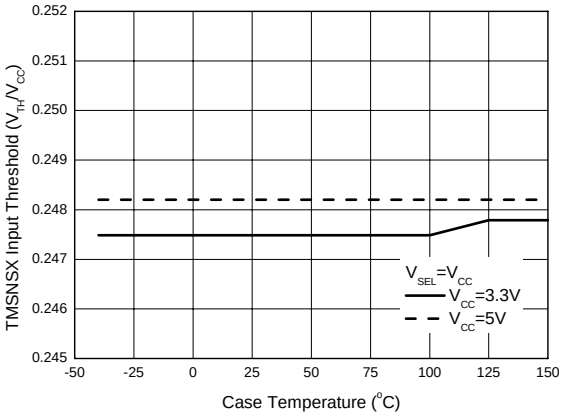


Figure 8. TMSNSX Input Threshold (V_{TH}/V_{CC}) vs. Case Temperature

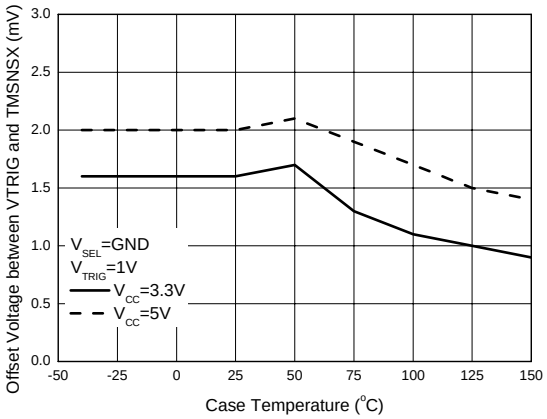


Figure 9. Offset Voltage between VTRIG and TMSNSX vs. Case Temperature

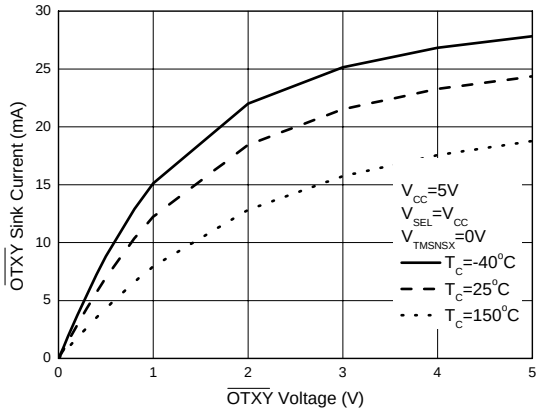


Figure 10. Open-drain $\overline{OTXY}$ Output Sink Current vs. $\overline{OTXY}$ Voltage

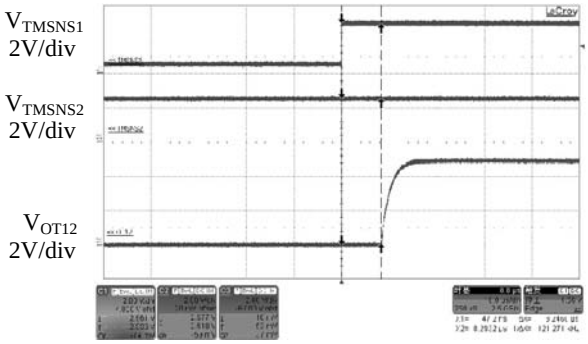


Figure 11. Deglitch time to OT High ($V_{SEL}=V_{CC}$)
(Conditions: V_{CC}=5V, V_{TMSNS1}=0.5V to 3V, V_{TMSNS2}=2.5V)

Typical Performance Characteristics (Continued)

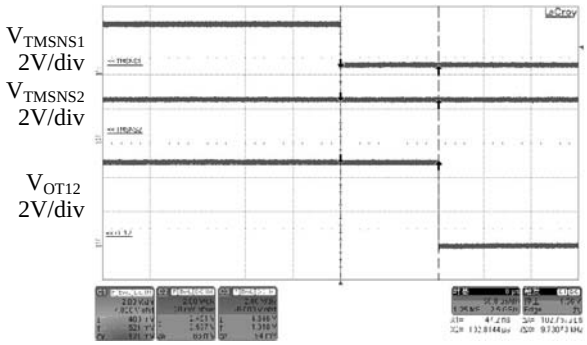


Figure 12. Deglitch time to OT Low (V_{SEL}=V_{CC})
(Conditions: V_{CC}=5V, V_{TMSNS1}=0.5V to 3V,
V_{TMSNS2}=2.5V)

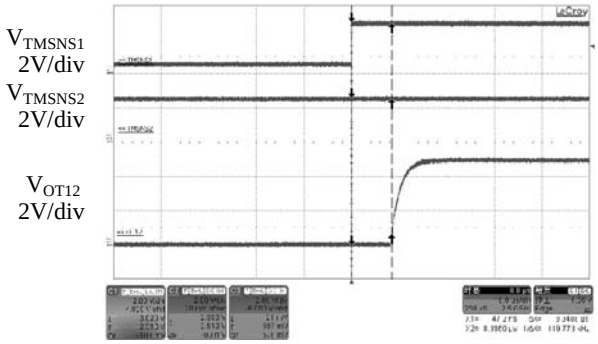


Figure 13. Deglitch time to OT High (V_{SEL}=GND)
(Conditions: V_{CC}=5V, V_{TMSNS1}=0.5V to 3V,
V_{TMSNS2}=2.5V, V_{TRIG}=1V)

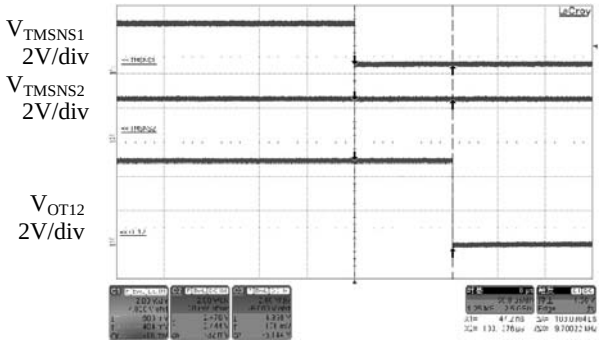


Figure 14. Deglitch Time to OT Low (V_{SEL}=GND)
(Conditions: V_{CC} =5V, V_{TMSNS1}=0.5V to 3V,
V_{TMSNS2}=2.5V, V_{TRIG}=1V)

Typical Application

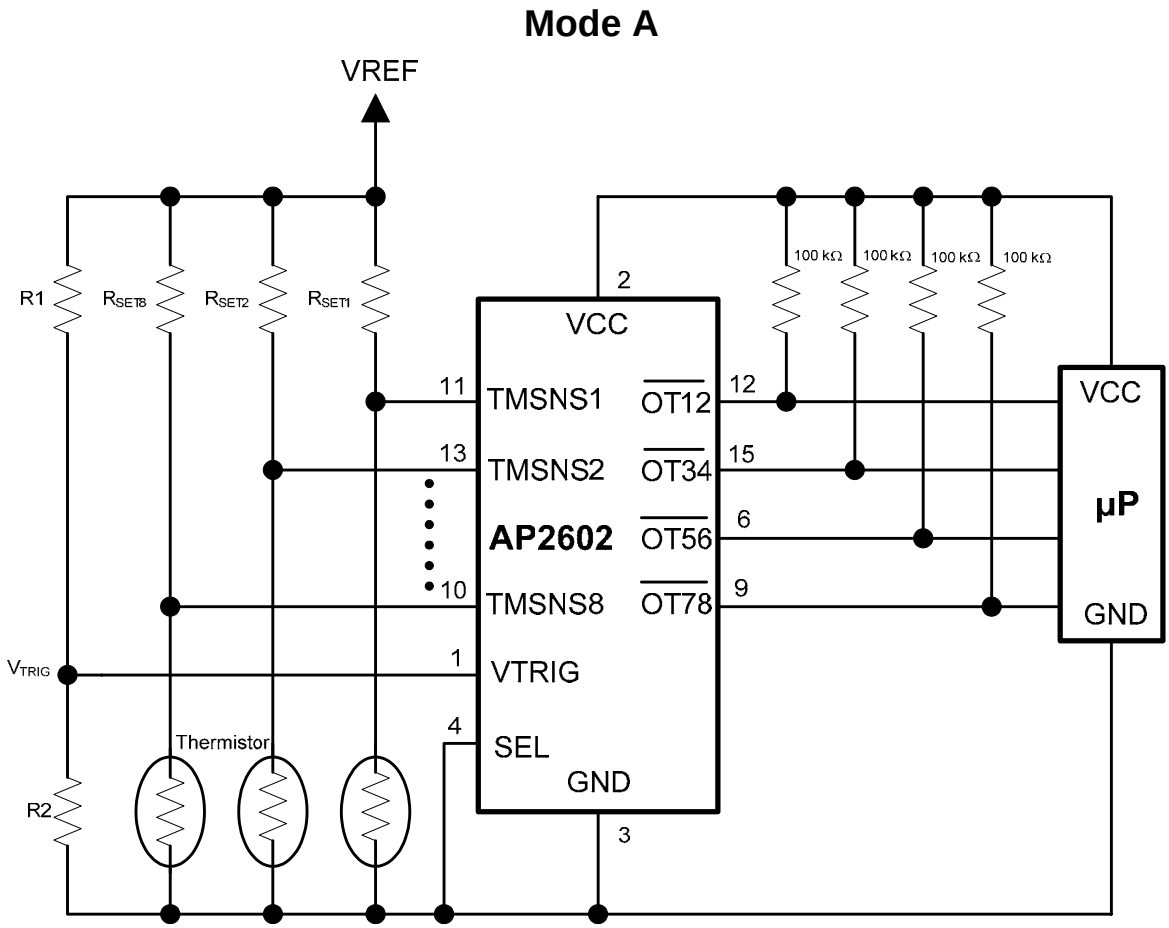


Figure 15. Typical Application of AP2602 (Mode A)

Typical Application (Continued)

Mode B

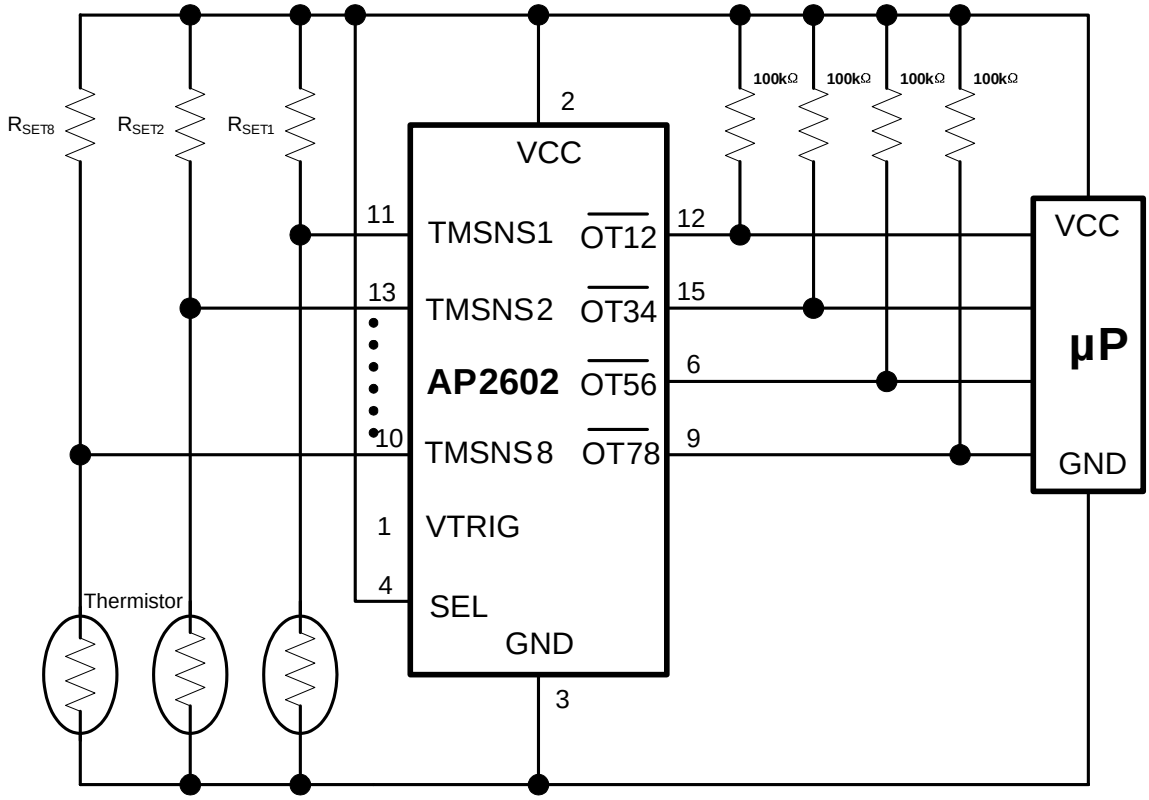
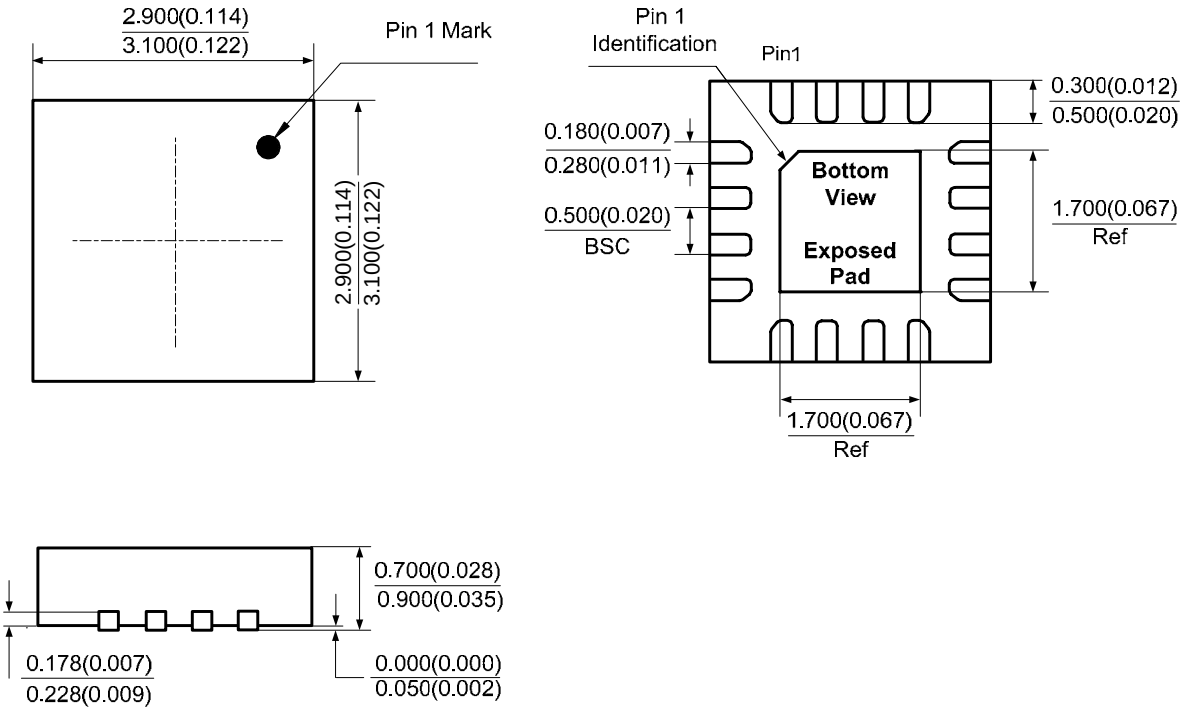


Figure 16. Typical Application of AP2602 (Mode B)

Mechanical Dimensions

QFN-3×3-16 **Unit: mm(inch)**



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